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REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
APPLICATION FOR A PATENT AND
ACKNOWLEDGEMENT OF RECEIPT
(Sect. 30(1) Regulation 22)

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FORM P.1
(to be lodged in duplicate)

A & A REF: 128625

THE GRANT OF A PATENT IS HEREBY REQUESTED BY THE UNDERMENTIONED APPLICANT ON THE BASIS OF THE PRESENT APPLICATION FILED IN DUPLICATE

PATENT APPLICATION NO.	
21 01	94 4480
71	FULL NAMES(S) OF APPLICANT(S)

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54 TITLE OF INVENTION

ADVANCE WORKING MACHINE OF LOW CONSTRUCTION HEIGHT

Only the items marked with an "X" in the blocks below are applicable.

[X] THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. The earliest priority claimed is Country: AT No: A 1244/93 Date: 24 JUNE 1993

[ ] THE APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO. |21|01|

[ ] THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND BASED ON APPLICATION NO. |21|01|

THIS APPLICATION IS ACCOMPANIED BY:

[X] ~~A complete copy of the specification~~ two copies of a complete specification of 10 pages.
[X] Drawings of 2 sheets. (Triplicate)
[X] Publication particulars and abstract (Form P.8 in duplicate) (for complete only).
[X] A copy of Figure 1 of the drawings (if any) for the abstract (for complete only).
[ ] An assignment of invention.
[ ] Certified priority document(s) (State quantity): .....
[ ] Translation of the priority document(s).
[ ] An assignment of priority rights.
[ ] A copy of Form P.2 and the specification of RSA Patent Application No. |21|01|
[X] A Form P.2 in duplicate.
[ ] A declaration and power of attorney on Form P.3.
[ ] Request for ante-dating on Form P.4.
[ ] Request for classification on Form P.9.
[ ] Request for delay of acceptance on Form P.4.
[ ]

74 ADDRESS FOR SERVICE: Adams & Adams, Pretoria

DATED THIS 22 DAY OF JUNE 19 94

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FORM P7

REPUBLIC OF SOUTH AFRICA
Patents Act, 1978

COMPLETE SPECIFICATION

(Section 30 (1) - Regulation 28)

OFFICIAL APPLICATION NO.	LODGING DATE
21 01 94/4480	22 22 JUNE 1994

INTERNATIONAL CLASSIFICATION
51 E21C

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TITLE OF INVENTION
54 ADVANCE WORKING MACHINE OF LOW CONSTRUCTION HEIGHT

ADVANCE WORKING MACHINE OF LOW CONSTRUCTION HEIGHT

The invention relates to an advance working machine of low construction height with a dust extraction, in which an extraction duct runs through a hollow cutting arm which can pivot in the vertical direction, and where the mined material can be transported away via a conveyor which is located in the longitudinal central plane of the advance working machine and is height adjustable.

Advance working machines of the aforementioned type, which beyond this should have armature boring and setting equipment, have to supply suitable working spaces for those persons who are to work with such armature boring and setting equipment near the cutting face, respectively near the cutting equipment, so as to create suitable conditions for the setting of armatures near the cutting face. With such an advance working machine with integrated armature boring and setting equipment, a corresponding extraction of dust must take place, therefore, in the direct vicinity of the cutting devices, which also can ensure that the two operators for the operation of the armature boring and setting equipment can remain in sight contact with each other. The dust extraction equipment directly at the place where the dust is generated must not, in consideration of the desired sight contact, be accompanied by additional superstructures and for this reason also the construction of an advance working machine of the aforementioned type should have as low a construction height as possible. When using this type of machine with low tunnel heights, the dust extraction equipment must also not exceed that machine height which is given by lowering construction elements, such as conveyors and cutting arms, into the lowest position, so as not to unnecessarily waste construction height.

Advance working machines of this general type have already become known in which the extraction ducts are brought to the cutting drum in the interior of the cutting arms. Such a design can, for example, be found in US-PS 3 603 644 or US-PS 3 810 67. It has already been proposed to install in such extraction ducts in the interior of a cutting arm a nozzle system and a filtration device, which is for example described in US-PS 4 531 784. Altogether the installation of extraction ducts in twin arm cutting bars presents only minor difficulties. However, such designs have to be discarded if an advance working

machine with integral armature boring and setting equipment is to be used, in which the operators of armature boring and setting equipment have to find a correspondingly protected space near the cutting face.

From US-PS 4 380 353 a dust extraction system for a winning machine has become known, where extraction openings are located on the extension arm directly behind the cutting tools, which open into an extraction duct which is located laterally on the machine frame. A blower and a cleaning plant for the extracted gases is connected to this extraction duct. Since the extraction duct is provided laterally on the base frame of the winning machine, the manoeuvrability of the overall machine suffers in general and over and above this it is not possible, in a simple manner, to provide an armature boring and setting device in the frontal machine sector behind the cutting tools.

Furthermore, designs of sectors of a conveyor cover have become known which can be moved into each other telescopically and can be pivoted against each other in a limited way.

The invention now aims at the creation of an advance working machine of the aforementioned general type in which, together with especially low construction height, a high measure of tightness of the extraction equipment is guaranteed, even if a cutting machine is selected in which the cutting arm is attached to a basic machine frame in the longitudinal direction in a movable manner. The invention furthermore aims at the further development of such a design in such a manner that, on displacement and pivoting of the cutting arm, a minimum displacement of the aggregates located in series is required and that simultaneously an especially low total construction height can be maintained in the lowered position of the cutting bar.

In accordance with the present invention the cutting bar is connected to the basic frame, movable in the longitudinal machine direction, and is connected by means of a telescopic duct at its end which is remote from the cutting tools, near the pivotal axis, with the end of the telescopic duct which is remote from the cutting bar being attached to the conveyor by means of a jointed connection and has the connections for an air duct. In such a design it is ensured that, when the extension arm is moved in the longitudinal direction, the telescopic duct is only

extended or contracted via a first partial sector of the movement path of the extension arm, and only when the whole conveyor is to be moved together with the extension arm, respectively subsequent to it, then the rear linkage point of the telescopic duct is also pulled up. Through the articulated connection of the telescopic extraction duct on the cutting arm the required mobility of the two construction parts, which are to be connected in an airtight manner, is guaranteed, whereby through the jointed arrangement of the telescopic duct on the means of transport, respectively on the conveyor, a pivoting out of the way of the extraction duct on passage of larger material is made possible, whereby an overall low construction height is achieved. By means of coupling of the extraction duct with the horizontal displacement of the cutting bar and of the centre transporter, a telescopic lifting in the extraction duct is only required for half the total advance of the cutting equipment, whereby the conveyor can be connected by half the advance path by a link type coupling, as corresponds to a preferred further development. By means of the selected articulated coupling on the cutting arm and to the conveyor, the lowering of the extraction duct inside the machine height predetermined by the cutting bar is made possible, whereby the further development is to advantage made in such a manner that the free outlet end of the extraction duct is located in the hollow cutting bar above the pivot axis for the height pivoting and that a telescopic part of the duct is connected by means of an articulated joint via a slotted guide to the cutting bar and can be inserted in a movable manner into the exit cross-section of the extraction duct. Such a development results, in the lowered position of the cutting bar, in a particularly low construction height and permits the tight connection of the telescopic duct onto the extension arm by resting the duct under its own weight and of that of the reverted edge seal lying against the upper side of the duct.

According to a further preferred embodiment of the invention the swivel pin of the extension arm is attached to a sled which can move in the longitudinal direction of the machine and the sled with the two carry away conveyors and a loading ramp is connected in the longitudinal machine direction with a limited mobility. Such a coupling of the centre conveyor with the sled for the displacement drive of the cutting bar leads to the situation that, for part of the

displacement and near the cutting face, which ever is required, a post adjustment of the conveyor is not yet required, so that above all pass cutting can proceed without the power requirements needed for an adjustment, respectively pulling up, of the conveyor.

Development has been carried out to advantage in such a manner that the telescopic duct is attached to the rear carry away conveyor via a slotted guide running at right angles to its longitudinal axis, with the two carry away conveyors being coupled with the sled for the cutting arm via a slotted guide running in the longitudinal direction, whereby the desired vertical pivoting and moving out of the way of the rear end of the telescopic duct on passage of large material is guaranteed.

According to a particularly preferred embodiment the loading device is coupled with the sled for the cutting arm via a slotted guide, more particularly the movable bearing of the carry away conveyor, whereby the adjustment of the loading equipment after a predetermined travel of the sled for the extension arm is guaranteed. Preferably link brackets are connected with the cutting arm which dip into the cutting bar's extraction duct which is oval in cross-section, and which is connected by an articulated joint resulting in a particularly low construction expenditure with simultaneous great tightness.

In accord with a further preferred embodiment the two conveyors are supported so that they can pivot in the vertical direction via catch bolts, whereby overloading of the bearings can be avoided.

In order that the invention may be more clearly understood and put into practical effect there shall now be described in detail a preferred embodiment of an advance working machine in accordance with the present invention. The ensuing description is given by way of non-limitative example only and is with reference to the accompanying drawings, wherein:

Figure 1 is a diagrammatic side view of an advance working machine according to the invention; and

Figure 2 is a top view of the advance working machine of Figure 1.

In Figure 1 a travelling cutting machine is represented which has an endless-track type drive 2. On the drive 2 there is a sled 3, which is supported

in a movable manner in the direction of the double arrow 4 which corresponds to the longitudinal machine direction, whereby the displacement drive consists of a cylinder piston aggregate 5. On this sled 3 a cutting arm 7 is supported around an axis 6 and can swivel in the vertical direction. On the free end of the cutting arm cutting drums 8 are supported so that they can rotate.

A loading ramp 9 is, furthermore, connected with the machine frame of the drive 2 which can be adjusted in the vertical direction by way of a hydraulic cylinder-piston aggregate 10 around the axis of the catch bolt 18. A further carry away conveyor 29 is connected by an articulated link, which can be made to pivot by means of a hydraulic cylinder-piston aggregate 11 around the axis of the catch bolt 18 in a vertical direction, with the loading ramp 9, which changes gradually into a conveyor (30), running in the longitudinal machine direction.

In the area of the cutting machine next to the cutting drums roof bolts 12 are represented diagrammatically which, together with the diagrammatically indicated hydraulic cylinder-piston aggregates 13, erect a protective wall against the cutting face and which represent a support for armature boring and setting installations.

The interior of the cutting bar 7 is designed to be hollow and by way of this cutting arm 7 as well as by way of a telescopic duct 14 connected to cutting bar 7, dust can be extracted by suction, for which purpose an air duct 15 is connected to the rear end of the telescopic duct. In case of a displacement of the cutting bar in the direction of the double arrow 4 with the sled 3 a first part of the displacement path can be taken up by the telescopic duct 14 without displacement of the air duct 15, whereby the telescopic duct is supported in an articulated manner at its connection in the area next to the air duct 15 on a support 16 in a slot 17 running in a vertical direction and this support 16 is connected with the rear carry away conveyor 29. After completion of a predetermined displacement path of the cutting bar 7 in the longitudinal direction of the machine a catch bolt 18, which is guided in a slot 19 in the longitudinal direction of the machine of a support part 20 of the sled 3 and, therefore, of the cutting bar 7 in the direction of the end of the machine, is displaced so far to the left that the conveyors 29 and 30 and the loading ramp 9 are taken along at a

further movement of the sled 3 and therewith of cutting bar 7 in the direction of the end of the machine. From this point in time there is no further telescopic contraction of the telescopic duct 14, as the telescopic duct 14 is coupled by its rear end with the conveyor 29. Through the support of the rear end of the telescopic duct 14 in a slot 17 an evasive movement is admitted in the direction of the double arrow 21 so that even large rocks can be conveyed away without hindrance and do not impede the effect of the conveyor 29.

A pivoting of the cutting bar 7 in a vertical direction takes place by way of a hydraulic cylinder-piston aggregate 22, which connects outside the swivel pin 6 and above the same on the cutting bar 7. In this the external pipe of the telescopic duct 14 dips into the rear opening of the hollow cutting bar, whereby linkage is articulated and again a slot is provided, in order to make possible adaptation in the vertical direction. The bearing bolts for the fixing of the telescopic duct are labelled 23 and the brackets 24 are fixed to the rear end of the cutting bar. These brackets 24 support the bearing bolts 23 whereby the slot, which runs at right angles to its longitudinal direction, is provided on the outside of the telescopic duct. In this manner the telescopic duct rests under its own weight on the lower edge of the opening of the cutting bar and an elastic screen 25 is sufficient for a substantially dust-tight closure. During dust extraction by way of air duct 15 the elastic reverted edge seal 25 is pressed against the upper edge of the external pipe of the telescopic duct 14, whereas the lower edge of the outer pipe of telescopic duct lies, because of the slotted guide under its own weight, in a sealing manner against the lower edge of the opening of the hollow cutting bar. The linkage brackets 24, which are connected with the cutting bar, hereby also dip into the rear opening of the cutting bar so that a lateral sealing is also achieved by means of these lateral linkage brackets 24.

Through the kinematics of the linkage of the height adjustment drive of the cutting bar 7 a comparatively low construction height is guaranteed. When pivoting the cutting bar 7 around the axis 6, then because of the articulated linkage of the telescopic duct 14, this duct can adapt to the movement as required. Because of the fact that the telescopic duct 14 dips into the cutting bar outside the swivel axis 6, there results during a swivelling the necessity of an

offset of length, which can be taken up by the telescope and through the offsetting capability in the slot running at right angles to the longitudinal axis a tight seal is always guaranteed. In order to be certain of the seal even during vertical swivelling, the support bolt 23 is located in the outlet plane of the extraction duct of the cutting bar. Through the fact that after a predetermined telescope path the rear end together with the carry away conveyor 29 are displaced during a displacement of the sled 3, it is on the one hand ensured that the cutting drums do not collide with the loading ramp 9 and on the other hand a compact and low construction height is retained over a large field of operations.

In the representation according to Figure 2 the relative symbols of Figure 1 are retained, whereby especially in connection with telescopic duct 14 it can be once more clearly seen that the frontal partial sector of this telescopic duct 14 is formed by an external pipe 26 which dips into the rear end of the cutting bar 7. Furthermore, it can be seen in the top view according to Figure 2 that the carry away conveyor 29 subsequently can also be pivoted around an axis 27 and has been developed by bending from the longitudinal axis, so that the progressing part 28 of the carry away conveyor 10 can unload also laterally to the cutting machine onto following carry away equipment. Furthermore, in Figure 2 the top view onto the roof bolts 12 can be seen, whereby below these roof bolts 12 the operators of the armature boring and setting find a secure and protected work place. The space required in each case to the right and to the left for the operators of the armature boring and setting equipment necessitates the design of a cutting arm with only one arm, so as to leave free the corresponding lateral space. Designs which use a plurality of extension arms which are parallel to each other cannot be used without further ado in this case.

CLAIMS

1. An advance working machine of low construction height with a dust extraction, in which an extraction duct is passed through a hollow cutting arm which is adapted to be swivelled in the vertical direction and where the mined material is adapted to be transported away via a height-adjustable conveyor located in the longitudinal centre plane of the advance working machine, wherein said cutting arm is attached to a base frame of said machine in a manner as to be adapted to move in the longitudinal direction of the machine and is in contact with a telescopic duct at its end which is located remote from said cutting tools, near said swivel axis, and wherein the end of said telescopic duct away from said cutting arm of said telescopic duct is linked with said conveyor with an articulated joint and has the connections for an air duct.

2. The advance working machine according to claim 1, wherein a free outlet end of said extraction duct is located in said hollow cutting bar above the swivel pin for height adjustment, and wherein a telescopic part of said duct is connected by a joint via a slotted guide to said cutting bar and is adapted to be inserted into the outlet cross-section of said extraction duct in a movable manner.

3. The advance working machine according to claim 2, wherein a drag bearing of said cutting bar is located on a sled which is movable along the longitudinal direction of said machine, and wherein said sled is connected with both carry away conveyors and a loading ramp in such a manner that it has limited mobility along the longitudinal direction of said machine.

4. The advance working machine according to claim 1, 2 or 3, characterised in that the telescopic duct (14) is connected via a slotted guide (17) running at right angles to its longitudinal axis with the rear carry away conveyor (29), and that the two carry away conveyors (29, 30) are coupled with the sled (3) for the cutting bar (7) via a slotted guide (19) running in its longitudinal direction.

5. The advance working machine according to claim 3 or claim 4, wherein loading equipment is coupled with said sled for said cutting bar, via a slotted guide.

6. The advance working machine according to any one of claims 1 to 5, wherein joint brackets are connected with said cutting bar and which dip into

extraction duct of said cutting bar, the cross-section of which is oval in shape, and are connected in an articulated manner with said telescopic duct.

7. The advance working machine according to any one of claims 1 to 6, wherein said two conveyors are supported above said catch bolts and are adapted to be swivelled vertically.

8. A new machine, substantially as herein described.

DATED THIS 22 DAY OF JUNE 1994

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2 SHEET (S)
SHEET No. 1

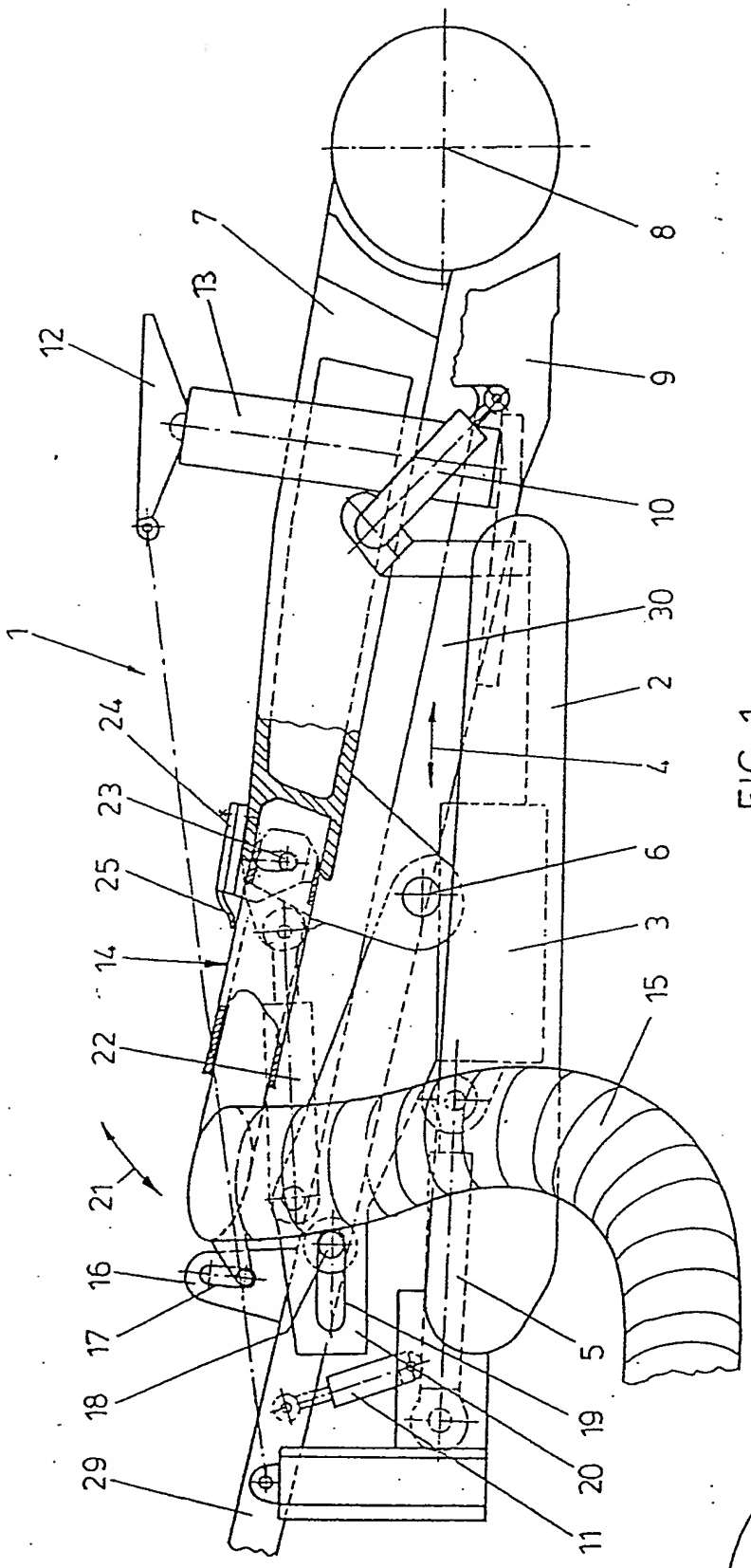

FIG. 1

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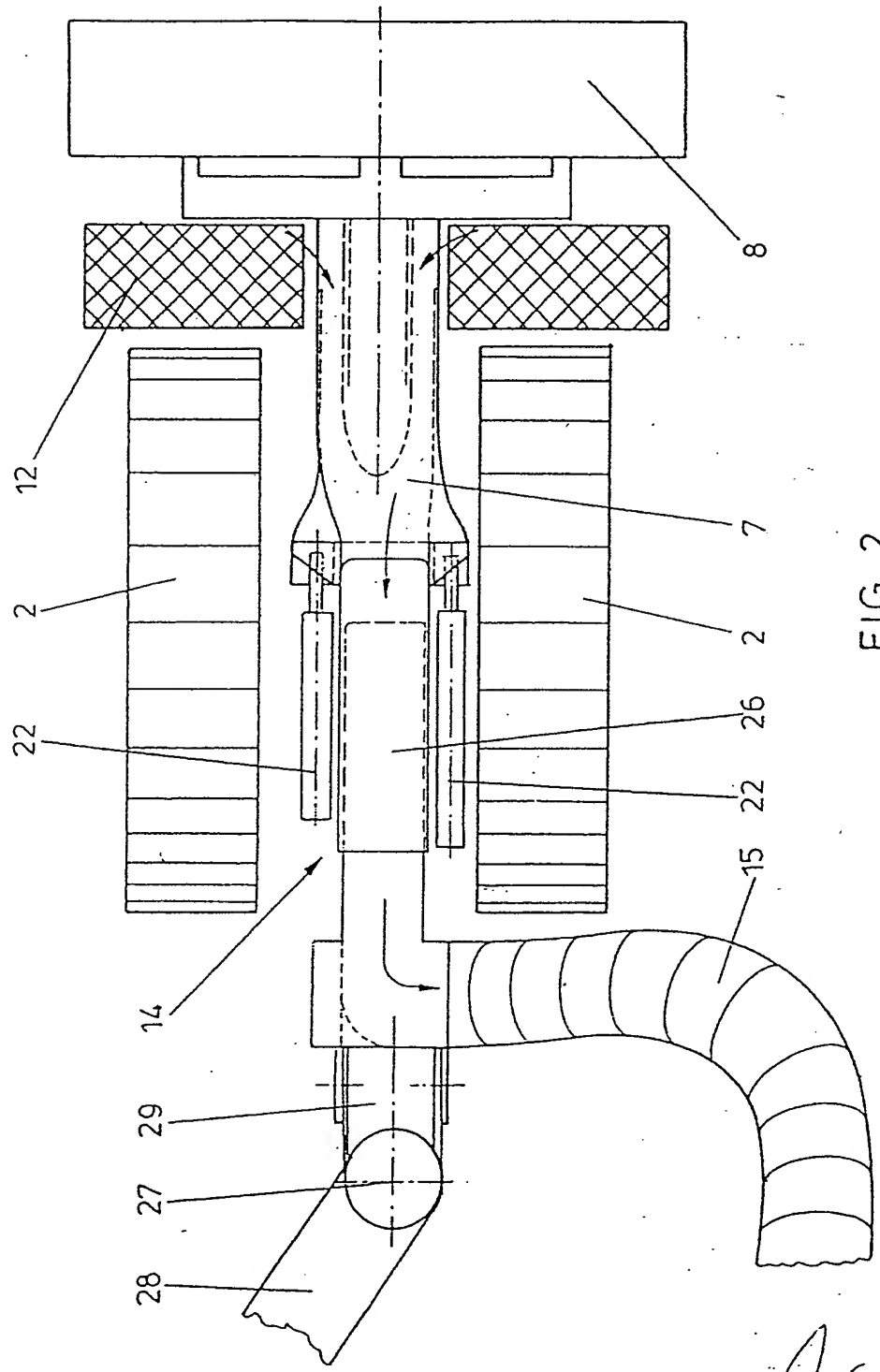

FIG. 2